

## Phase Reconfigurable Nulling Interferometer, Phase I

Completed Technology Project (2016 - 2016)



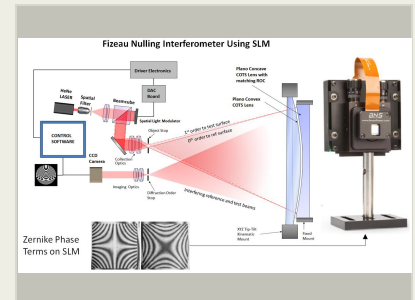
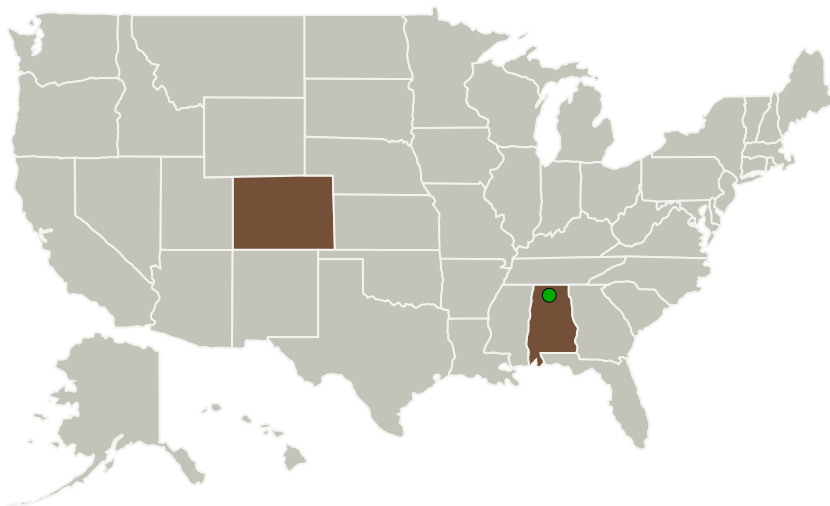
## Project Introduction

We propose the use of a phase reconfigurable spatial light modulator (SLM) in place of a static computer generated hologram (CGH) in interferometric test systems for next generation meter class telescope optics. A liquid crystal on silicon (LCoS) SLM offers additional flexibility, potentially higher measurement precision, and relaxed alignment requirements over static CGHs.

Programmable phase provides the user with the ability to test different optical components without requiring the design of a different CGH in each case.

Applying the phase to the SLM in-situ, to generate the optical null, greatly relaxes the requirements for the critical alignment precision associated with CGHs. Additional measurement precision may be achieved by applying additional piston phase changes to the SLM hologram in the manner of a vibration free phase shifting interferometer. Phase errors due to air currents could potentially be removed on the fly, and phase errors in other system components could also be compensated. Phase I examines a small format 512x512 10 bit SLM on a benchtop test interferometer to validate the concept using commercial off the shelf (COTS) components. A phase II continuation would implement a 31mm square large format 1536x1536 SLM with 768 waves of applicable phase stroke.

## Primary U.S. Work Locations and Key Partners



Phase Reconfigurable Nulling Interferometer, Phase I

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

## Phase Reconfigurable Nulling Interferometer, Phase I

Completed Technology Project (2016 - 2016)



Organizations Performing Work	Role	Type	Location
Boulder Nonlinear Systems, Inc.	Lead Organization	Industry	Lafayette, Colorado
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

## Primary U.S. Work Locations

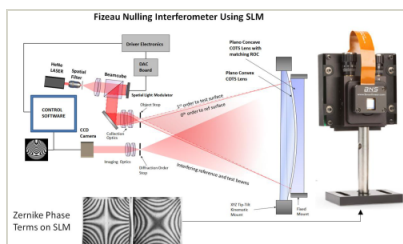
Alabama	Colorado
---------	----------

## Project Transitions

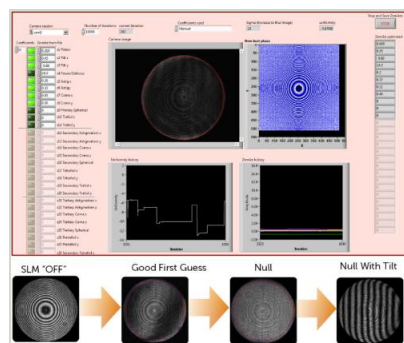
**June 2016:** Project Start**December 2016:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140202>)

## Images

**Briefing Chart Image**

Phase Reconfigurable Nulling Interferometer, Phase I

(<https://techport.nasa.gov/image/128165>)**Final Summary Chart Image**

Phase Reconfigurable Nulling Interferometer, Phase I Project Image

(<https://techport.nasa.gov/image/127644>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Boulder Nonlinear Systems, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

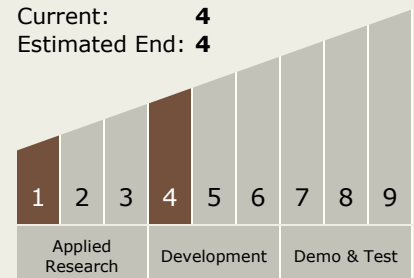
Carlos Torrez

**Principal Investigator:**

Hugh Masterson

## Technology Maturity (TRL)

Start: 1  
 Current: 4  
 Estimated End: 4



# Phase Reconfigurable Nulling Interferometer, Phase I

Completed Technology Project (2016 - 2016)



## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.2 Observatories
    - └ TX08.2.1 Mirror Systems

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System